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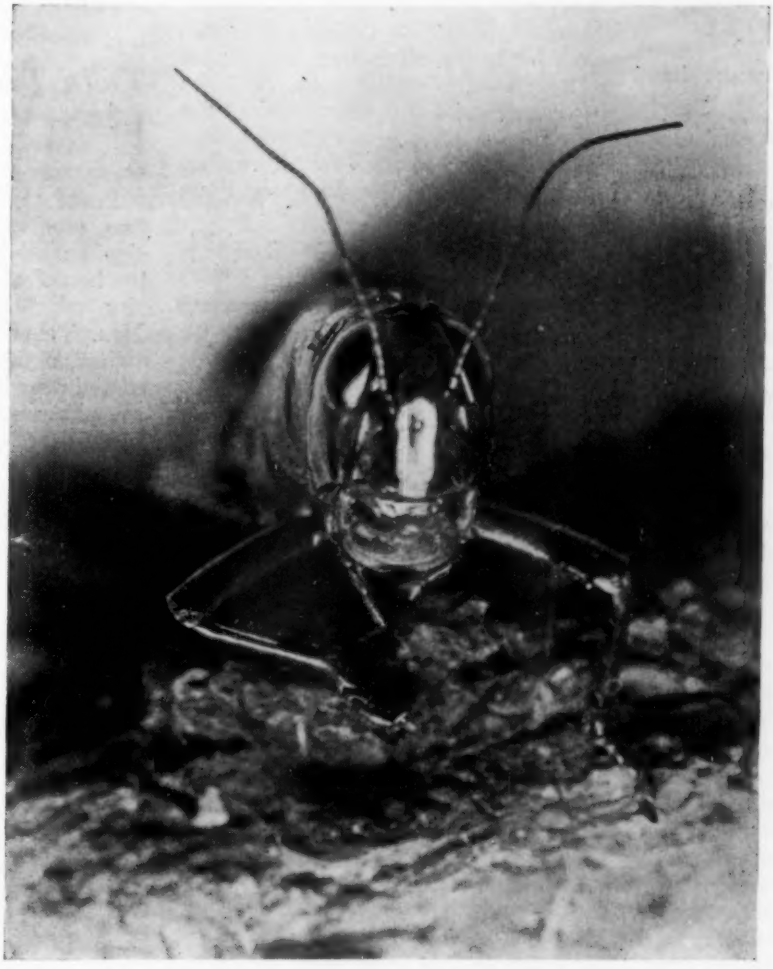
SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

A SCIENCE SERVICE PUBLICATION

$5 a Year 15c a Copy May 24, 1930



MEET THE ENEMY

Locust Armies Threaten in Two Hemispheres

(See page 326)

Vol. XVII No. 476

New Comet Brightest on June 1

Astronomy

May Be Faintly Visible to The Naked Eye

THE new comet recently discovered by the German observers Schwassmann and Wachmann may become visible to the naked eye on June 1, and will certainly be discernible with the aid of a small telescope or a pair of good field glasses. The last few nights of May and the first few nights of June will be great times for the army of amateur telescope fans, who make and use their own reflecting telescopes. With instruments of this type, the new comet can easily be seen, if one knows where to find it.

The orbit of the new comet has been calculated by F. L. Whipple and Phyllis Hayford of the Students' Observatory of the University of California, under the direction of Prof. R. T. Crawford. Their preliminary results indicate that the comet will reach its maximum brightness on June 1 when it will be only eight million miles away from the earth.

The comet will be between sixth and seventh magnitude in brightness on the night of June 1. For most persons with ordinarily good eyes, sixth magnitude stars are the faintest that can be seen; so that the celestial visitor may just barely cross the borderline into naked-eye visibility. It is a small comet, without any tail, which accounts for the minor show it is putting up in spite of its close approach to the earth.

At that, however, it is the nearest thing we have had to a visible comet for many years. Although the solar system is visited by anywhere from two or three to a dozen comets each year, most of them are too small or stay too far away to be seen except with the big telescopes of astronomical observatories. The last really good look the lay world has had at comets was in 1910, when two big comets, one of them the returning Halley's comet and the other known simply as the "Comet of 1910", blazed in the sky at the same time. Both of these were huge affairs, with magnificent tails sweeping across a large fraction of the heavens. The present visitor is much less pretentious.

The astronomical position of the Schwassmann-Wachmann comet on June 1, corresponding to earthly latitude and longitude, will be approximately 21 hours right ascension and plus ten degrees declination. This is a spot a little to the southeast of the constellation of the Dolphin, a small group of bright stars that lies almost directly south of Cygnus, or the Northern Cross, well down toward the horizon. At nine in the evening the Dolphin is low in the east; it reaches its highest point in the sky about three in the morning.

If the new comet becomes visible to the naked eye it will appear simply as a very faint star. With the aid of a telescope or strong field glasses it will be distinguishable as a somewhat fuzzy nucleus of light, contrasting with the stars, that show up as sharp little pin-pricks.

On June 13 the comet will reach perihelion, or its nearest approach to the sun. At that time it will be about ninety million miles from the sun, or approximately the distance of the earth's own orbit. After the middle of June it will rapidly recede and dwindle in size, until even the astronomers will see it no more.

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The Answer Is

In This Issue

Will you see the *new comet?* p. 322—Do *trees* ever have twins? p. 322—When is the whole *greater* than the sum of its parts? p. 323—What was *Bill Stumps'* stone? p. 324—How do locusts *march?* p. 326—What *outspeeds* the telegraph? p. 327—Where is the storm's *eye?* p. 327—When did *yeasts* begin sinning? p. 328—How fast can you *wash dishes?* p. 329—Which is *better,* oil or viosterol? p. 329—Where do they get *diamonds* with a steam-shovel? p. 329—Why do you hate *jazz?* p. 329—What ailed Java Man's *thighbone?* p. 330—What is the *bluest* bird? p. 333—What are *mice* good for? p. 333—*Who* is Prandtl? p. 333—What did the Mayas *eat?* p. 334—Is Peking Man a *Neanderthaler?* p. 334—How do *aviators* find their way in a fog? p. 335—Have you *sense* enough to drive? p. 335.

Twin Trees

FOR the first time in the records of science, an evergreen tree has borne twins.

Proof that there is a possibility of two plants being produced from a single seed has just been obtained at the botanical laboratory of the University of Southern California, where Mrs. Tema Shults Clare, a teaching fellow, obtained in two instances pairs of twin seedlings sprouting from Torrey pine seeds, and one pair of similar twins from the seed of a pinyon pine.

Further examination of seeds showed that this condition is possible in at least a small percentage of pine seeds. One ambitious pinyon pine seed contained the beginnings of six little plants, four of which had developed to a point indicating that they might have grown if the seed had been planted. Mrs. Clare's work is supported by earlier researchers, who although they did not sprout twin seedlings at least observed potential twins in seeds which they dissected.

This habit of twinning from single seeds is peculiar to the gymnosperms, the great division of the seed plants to which pines and other evergreens belong. The higher seed plants, the producers of showy flowers, apparently do not have this possibility.

Botany

Science News-Letter, May 24, 1930

SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

In requesting change of address, please give old as well as new address.

Advertising rates furnished on application.

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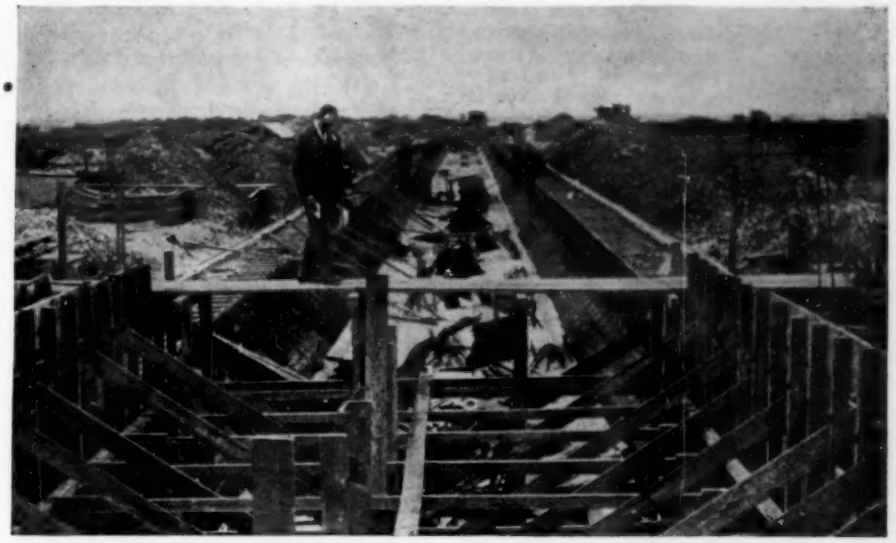
Giant Wind Tunnel At Langley Field

Aviation

Test Basin For Seaplanes Also Being Constructed



The long seaplane testing basin under construction by the National Advisory Committee for Aeronautics at Langley Field, Va. The floor of the channel can be seen extending nearly half a mile in this photograph.

TWO new and unique research aids to better airplanes are under construction at the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics.

One will be the largest wind tunnel in the world, in which a whole airplane can be tested. The other will be the world's largest testing basin, a covered body of water nearly half a mile long, 25 feet wide and 12 feet deep.

The governmental aeronautical research laboratory already has the largest wind tunnel in the world, the propeller research tunnel, with a testing diameter of 20 feet. In a wind tunnel a stream of air is made to flow past an airplane part or test specimen that is held stationary, and this produces exactly the same effect as though the airplane part were moving through still air. Thus the engineers can tell just what happens to an airplane in the air without the risk and inconvenience of actual flying. Precise scales and instruments attached to the airplane under test give data that make possible better design and financial savings by airplane designers. Airplane speed has been increased 10 to 12 miles per hour by the N. A. C. A. cowling developed in the 20-foot tunnel.

The wind tunnel now under construction will have a rectangular mouth 30 by 60 feet. An airplane can be taken from the flying field to the wind tunnel and put under test without any change whatever. A large building covering an area 434 by 222 feet will house the new giant tunnel. Two large propellers, each 35½ feet in diameter and powered by 4,000 horsepower electric motors, will furnish the air stream that will be equivalent to the rush of an airplane through the air in actual flight.

The seaplane testing basin also under construction is 2,060 feet long and will probably be in operation late this year. In it flying boats will be given test runs at speeds up to 60 miles an hour. Both Navy and commercial users of planes that land on water are eager to have adequate test information as to how floats and other water landing gear can best be built. At present floats and pontoons on seaplanes and amphibians are built more or less by rule of thumb because of lack of knowledge of the way they carry their loads. The testing basin is expected to furnish information that will allow better, more efficient and cheaper construction.

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Stone Age Tools In China

Archaeology

OLD Stone Age implements have been found in the eastern part of Shensi province along the upper courses of the Yellow River, proving that man existed there during the ice age, it was revealed at the annual meeting of the Geological Society of China held in Peiping recently.

The discovery was announced by Pére Teilhard de Chardin, the Jesuit priest who, with Pére Licent, found traces of a similar culture on the borders of the Ordos desert in 1923. Pére Teilhard is president of the Geological Society of France and ranks high among the world's paleontologists.

Among the specimens exhibited to the meeting were some typical paleolithic scratchers and a boulder of very hard quartzite which appeared to have been broken by heavy blows and probably was used for smashing up other pieces of stone into convenient sizes.

"Here we have proof that in pleistocene times man was living not only on the edge of small lakes in the Ordos desert but also along this part of the Yellow River," Pére Teilhard declared. "This culture is exactly the same as the one of which we found traces in 1923 and might be compared with the Mousterian culture associated with Neanderthal man in Europe."

Careful search may reveal a still more extended stone culture of that time in the fertile valley of the Yellow River, scientists at Peiping believe. The fact that the implements were found in the base of the loess is interpreted to mean that the land surface in which these early people dwelt was shortly afterwards overwhelmed by terrific dust storms which deposited millions of tons of windblown debris from the Gobi desert.

From then on, it is thought, all signs of human culture vanished from the stage, man having been driven out and not returning till his reappearance with a fully developed polished stone culture corresponding more or less to the neolithic culture of the post-glacial time in Europe.

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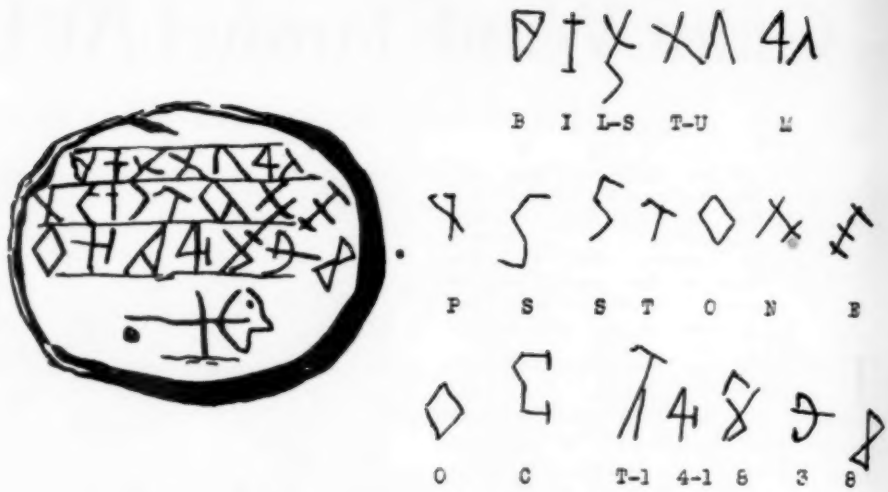


The famous Grave Creek Mound incription, now pronounced a hoax. Nineteenth century scholars argued over it long and heatedly. Some declared it to be written in Canaanite or other ancient language. An American printer has at last read it in "good old West Virginian." The separate letters as shown on the right are easily read.

Printer's Knowledge of Dickens Solves Scientific Hoax

Archæology

By Emily C. Davis

"BIL STUMPS STONE Oct 14 1838"

This inscription in cabalistic writing, cut into a little piece of stone, has baffled scientists both in America and abroad ever since it was dug out of an Indian mound in West Virginia almost a century ago.

Many experts on the world's languages tried in all seriousness to translate the cryptic writing, believing it to be written by ancient man in Canaanite, Celtic, Runic, or what not. Some of the scholars announced success, and strange and weird were their translations.

It has finally taken a West Virginia printer, who knows his Dickens and who has a keen sense of humor, to succeed where the scholars failed. His reading of the inscription "in good old West Virginian" clears up one of the greatest hoaxes in the record of American science. That hoax, perpetrated by some unknown practical jokesmith, has stood triumphantly undetected for ninety odd years.

The printer, Andrew Price, is an historian by hobby. He is President of the West Virginia Historical Society and a member of the West Virginia Academy of Science. He has been intrigued by the inscription for a long time, but never tried his hand at deciphering it until recently.

In a statement explaining how he came to solve the riddle, Mr. Price reminds us of the delightful bit of satire in a novel by Charles Dickens which gave the American joker his idea. Poking fun at British scientists of a century ago, Dickens had concocted the following inscription:

X
BILST
U M
PSHI
S.M.
ARK

Dickens had his famous character, Mr. Pickwick, discover this strange inscription on a small broken stone, lying partly buried by an ancient cottage. Mr. Pickwick, very much excited, asked the cottage owner about the age of the stone and was told that "It was here long before I war born, or any on us." Whereupon Mr. Pickwick bought the stone and returned in haste to London feeling that he had attained a great ambition. He, the Chairman of the Pickwick Club, had unearthed a curious inscription of unquestionable antiquity.

Dickens, tongue in cheek, continues the astonishing adventures of the antiquarian discovery:

"It appears from the Transactions of the Club, then, that Mr. Pickwick lectured upon the discovery at a General Club Meeting, convened on the night succeeding their return, and entered into a variety of ingenious and erudite speculations on the meaning of the inscription. It also appears that a skillful artist executed a faithful delineation of the curiosity, which was engraven on stone, and presented to the Royal Antiquarian Society, and other learned bodies—that heartburnings and jealousies without number were penned upon the subject—and that Mr. Pickwick himself wrote a Pamphlet containing ninety-six pages of very small print, and twenty-seven different readings of the inscription. That three old gentlemen cut off their eldest sons with a shilling apiece for presuming to doubt the antiquity of the fragment—and that one enthusiastic individual cut himself off prematurely, in despair at being unable to fathom its meaning. That Mr. Pickwick was elected an honorary member of seventeen native and foreign societies, for making the discovery; that none of the seventeen could make anything of it, but that all the seventeen agreed it was very extraordinary."

Then came forward a Mr. Blotton "with the doubt and cavilling peculiar to vulgar minds" and a theory of his own. He had cross-questioned the man who sold the stone and had been assured that the stone was indeed ancient, just as he informed Mr. Pickwick. But the inscription on it, that was another matter. The cottage owner had carved that to amuse himself one day, and it said simply, "Bil Stumps, his mark."

Blotton's version was received by the Pickwick Club with the contempt it deserved. Blotton was ejected from the club. He wrote pamphlets. The learned societies wrote pamphlets. There were translations of the pamphlets into all sorts of languages. "And,"

the story concluded triumphantly, "to this day the stone remains, an illegible monument of Mr. Pickwick's greatness, and a lasting trophy to the littleness of his enemies."

And now we can see how truth came to parallel fiction when the West Virginia joker got to work. This unknown and unsung person read "Pickwick Papers" and scratched an inscription very similar to Mr. Pickwick's discovery on a scrap of sandstone less than two inches long. He used, however, more complicated and obscure lettering. The hoax was planted in the Grave Creek Mound, at Moundsville, West Virginia, and was discovered by workmen in 1838, the very year following the publication of Mr. Pickwick's antiquarian adventure.

The Grave Creek Mound was a big and exciting excavation that summer. The mound stands in the town of Moundsville, rising like a mysterious giant cone seventy feet tall and covering an entire city block. Tunnels and shafts cut into the cone proved it to be a giant tomb. There were two vaults found inside. One vault contained a single human skeleton, and the other vault two.

Little was known about the mound-building Indians of prehistoric America in the eighteen thirties. So great a burial place for three people called to mind the building of the royal pyramids in Egypt, and this naturally led to the speculation as to which civilized race of ancients built the American tomb. Objects taken from this mound and from mounds of the same sort in other states revealed a manner of living very different from the lives of the "wild Indians" of hunting tribes.

The three who came to rest in the giant tomb of the Grave Creek Mound had been honored members of a group that understood agriculture. They wore ornaments of copper. The burial mound demonstrated that the people of their community were capable of handling large enterprises, involving organized labor. It was commonly believed that people with all these attainments could not be Indians, but that they must have occupied America before the red men came. Were they the Lost Tribes of Israel? Ancient Welsh? Egyptians?

The question had often been raised as to whether these mound builders could write. A bit of their writing might show the language they spoke and clinch some theory as to the land from which they immigrated. And here, out of the Grave Creek Mound, came a stone with writing on it.

We may well wonder if the person who planted the joke was standing by as the discovery was made, waiting for scientific fireworks. In Dickens' novel there was rapid drama. But the Grave Creek inscription was a little too good. It was accepted for the time being as the work of the ancients and probably unreadable.

Within three years, a room had been built up with brickwork inside the Grave Creek cone and here a little museum was established. For twenty-five cents, the tourist could enter one of America's prehistoric equivalents of the Egyptian pyramids. By faint candle-light he could look at the skeletons of some of these mysterious "Ancients." He could see their copper bracelets, beads, stone weapons—and a sample of their writings or charms. The Grave Creek inscription was still regarded as merely one exhibit among many from the mound.

But, gradually, the hoax began to work. Impressions of the inscription began to be made and sent to language specialists in this country and abroad. Papers on the inscription were read at meetings of learned societies. Pamphlets on it were printed. Some scholars pronounced it a fake antiquity, like many other fakes that have been planted for various reasons to deceive science. But none of these wise judges reached Mr. Blotton's triumphant state of being able to read the stone in ordinary English.

A report of the Bureau of American Ethnology, published fifty years after the inscription first appeared, sums up the more impressive attempts at mastering the Grave Creek inscription:

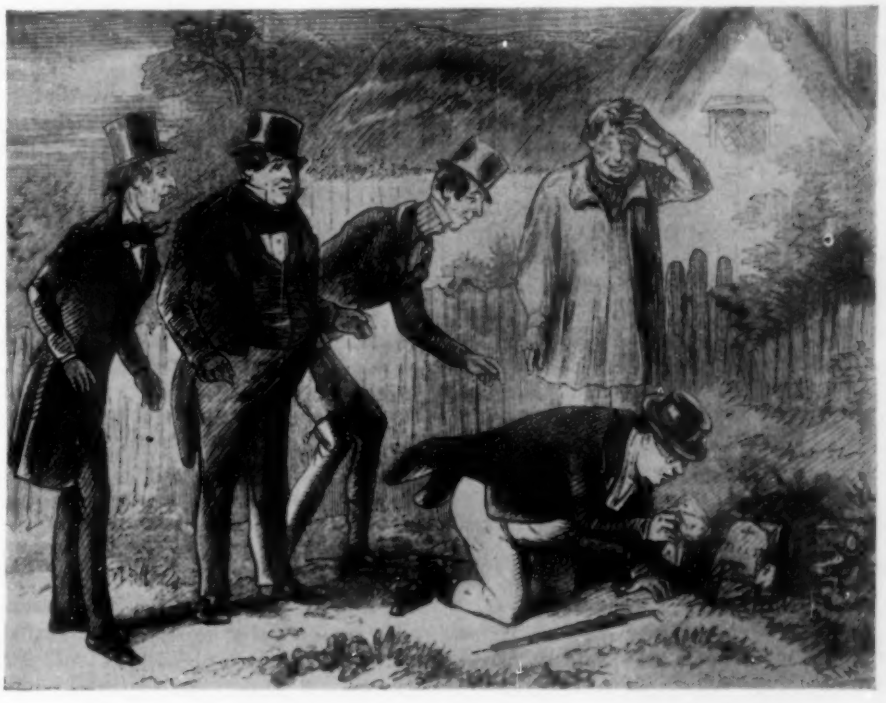
A French scientist, in 1856, translated the letters to mean: "The Chief of Emigration who reached these places has fixed these statutes forever."

Another French scientist, 1875, read a paper at the Congress of Americanists at Nancy, in which he translated the inscription as being Canaanite. His version was: "What thou sayest, thou dost impose it, thou shinest in thy impetuous clan and rapid chamois."

Another linguist decided that the meaning of the letters was: "The grave of one who was assassinated here. May God to avenge him strike his murderer, cutting off the hand of his existence."

One scholar who pored over the letters on the bit of stone, found there four characters which he called ancient Greek; four Etruscan; five Runic; six ancient Gaelic; seven old Erse; ten, Phoenician; fourteen old British; and sixteen Celtiberic.

The Bureau's report, which rehearsed these labors of science, took a cautious stand. (*turn to page* 332)



Mr. Pickwick making his great antiquarian discovery. This incident in the Dickens novel gave an American jokesmith the inspiration for a real scientific hoax. (Engraving by "Phiz")

Jewish Scientists Study Locusts

Entomology

Combating Insect Pest Deemed Major Problem

THE migratory locust of Africa, which shook the hard heart of Pharaoh of old and is now causing widespread damage throughout northern Africa and the Near East, is being attacked as a major scientific problem by entomologists of the Hebrew University in Jerusalem. Recent studies by Drs. F. S. Bodenheimer, G. Fraenkel, K. Reich and N. Segal have contributed new facts which will eventually be of use in conquering this age-old bringer of desolation and famine.

Although the locust is about the oldest of recorded insect pests, strangely enough very little positive knowledge has been gathered as yet regarding its biology, habits and primary breeding places. One of the first things developed by the Hebrew University scientists has been definite evidence that the locust is not strictly an insect of the desert, as has usually been supposed. There are strong indications that the primary breeding grounds of the insects that make trouble in Egypt, the Sinai region, Transjordania and Palestine are in the moderately moist borderlands of the desert, and that a bad locust year is almost always preceded by a decidedly rainy winter, giving the ground where the eggs are laid plenty of water in its upper layer. This hypothesis is supported by evidence gathered by earlier workers in the Sudan and elsewhere.

Studies both in laboratory and field indicate that the eggs are not formed in the body of the female locust until spring. After they are laid in the ground the young insects inside the shells require from two to four weeks before hatching. While they are passing through their five nymphal stages, growing larger each time they shed their skins, they begin their migratory march. In six or eight weeks they have become full grown winged adults, and their migrations become the vast flights that darken the sun and strip fields and orchards bare. Their adult life seems to last about ten months, completing the year's cycle.

Locusts are decidedly insects of clear sky and hot sun. They avoid the ground and the stones upon it during the chilly hours of night, roosting on the vegetation, especially on shrubs. When the first signs of dawn appear they hop down to earth, and creep about in small clumps until the first direct sunlight reaches them. Then they stop and sun themselves for a time, standing broadside on, to get the full benefit of the early rays.

As the day warms up, the horde begins its march. It keeps relentlessly ahead, climbing over all natural obstacles, and not diverting from its set course even when an easier route presents itself. If the weather is very hot, the insects stop for a siesta at midday, this time turning their bodies so as to expose as little surface as possible to the sun, or taking advantage of all chance patches of shade. On resuming march in the afternoon they feed voraciously, cleaning everything bare where they stop for lunch. Late in the afternoon, when the temperature falls, they call a halt, again sunning themselves, seeking dark stones for warmth whenever possible. Then they climb the shrubbery for the night.

These reactions seem to be governed by temperature rather than by light, for it has been found that when the weather is very warm they will march all night. Locusts are decidedly warm-weather creatures. At all stages in their lives they like high temperatures, thriving best when the mercury stands so high in the tube that human beings are distinctly uncomfortable.

Grasshoppers Threaten United States

Entomology

GRASSHOPPERS threaten to wreak heavy damage to grain and forage crops in Montana and the Dakotas this year. There were many hoppers in these states, and in parts of Texas, last year, and the eggs they laid are now hatching in large numbers. If climatic and other conditions favor the growth of the young insects the outbreak may reach serious proportions. The U. S. Department of Agriculture is urging farmers in the threatened regions to combat the pests now with poisoned bran baits, before they grow their wings and get beyond control by taking to the air.

The American grasshoppers that appear in great numbers, following some climatic or other cycle not yet understood, are close kin to the old-world locusts, that have already begun to play havoc in the fields and orchards of northern Africa, Egypt, Palestine, Greece and Roumania. They have always hung in threatening clouds on the western frontiers of American agriculture. Old-timers in Kansas can tell incredible tales of their sun-darkening flights that stripped rich wheat-fields to the naked ground in minutes. The decreasing seriousness of their raids during the past few decades is attributed partly to the breaking up of their breeding grounds by agriculture and partly to the success of combat methods used against them.

Some confusion and unnecessary alarm will doubtless be caused during the next few weeks by the outbreak of seventeen-year cicadas that is due to appear in an area stretching from southwestern Iowa down to the Oklahoma-Arkansas boundary. These insects are commonly called locusts, though they are not locusts at all, and really do very little permanent damage. The seventeen-year cicada is the longest-lived insect known, spending years as a root-sucking larva underground and appearing punctually at the end of that time to emerge as a winged insect, lay its eggs and die. The adult activities of the seventeen-year cicada cause leaves to wither on trees to some extent, but that is all the mischief the insect does. These pseudo "locusts" need cause no alarm; it is only when the true locust, the long-winged grasshopper, puts in his appearance that the crops are in danger.

The picture on the cover of this week's Science News-Letter, showing an ant's-eye view of a grasshopper, is from the camera of Cornelia Clarke.

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Mountain Park **New Mexico**

Seismograph Faster Than Telegraph

Seismology

Sends News of Quake While Broken Wires Lag

CABLE dispatches from Teheran, telling belatedly of a serious earthquake that killed 2,000 persons and caused widespread damage in the vicinity of Urumiya (Urumiah) Lake in northern Persia were anticipated by Science Service's announcement of the earthquake. The location of this disaster was determined a few hours after its occurrence through analysis of the telegraphed records of seismographs located in the United States, the Philippines, China and Canada.

The earthquake occurred Tuesday, May 6, at 5:34 p. m. Eastern Standard Time and sent its vibrations to all parts of the world. Within a few hours seismological observatories cooperating with Science Service had telegraphed, radioed or cabled their records. Experts of the U. S. Coast and Geodetic Survey utilized this data in locating the epicenter or place about which the earthquake centered.

Two days before interrupted communication brought direct cable news, Wednesday morning, Science Service announced to newspapers: "A violent earthquake occurred in northern Persia late yesterday. It is probable that many were killed and much damage was done."

Information from the region of the earthquake shows that the Persian disturbance is probably as serious as the Burma shock of May 5 about which more information has come to America.

According to the United Press dispatch the shock was most severe in an area west of the southern end of the Caspian Sea, some 400 miles northwestward of Teheran. The inhabitants are mostly Armenians.

Commander N. H. Heck, of the U. S. Coast and Geodetic Survey (right) and Frank Newman (left) determining the position of an earthquake from data furnished by Science Service. Commander Heck is in charge of earthquake investigations.

When the earth shakes severely, vibrations from the center of motion travel to all parts of the earth. They go in two principal ways, one through the center of the earth, the other along the surface. It is this fact that makes possible the determination of the quake's distance. The internal wave travels faster than the surface wave, and so is felt by distant seismograph stations first.

The seismograph, the instrument with which earthquakes are detected, consists essentially of a pendulum arranged to swing on the slighest motion of the earth under it. Greatly amplified, the motion is recorded on a moving strip of paper as a wavy line. Every minute a clock also makes a mark on the paper so that the exact time of a record can be obtained.

When an earthquake is not occurring, the line is straight. Then, as the first wave of a quake reaches the instrument, it starts to wave. A few minutes later, unless the quake is very close, another series of waves appears. These are the result of the vibration that travelled along the earth's surface.

Seismologists have studied many earthquakes and as a result they have compiled tables from which the distance of a quake from a seismograph can be determined from the difference in time of arrival of the two waves.

The record of a single station can only locate the earthquake on a circle at a certain distance from the station. Sometimes this circle may cross a region where earthquakes are frequent and then it would seem probable that the quake occurred there. However, when reports are received from several stations, circles can be swung on a globe around each of them. Where they intersect is the exact location of the quake.

By such a procedure Science Service, with the cooperation of the U. S. Coast and Geodetic Survey, the Jesuit Seismological Association and telegraphic reports from some 30 seismological stations throughout the world, locates many earthquakes.

Science News-Letter, May 24, 1930

What Happens To The Sun's Energy

Astro-Physics—Meteorology

WHAT becomes of radiant energy from the sun, which makes the earth livable, was reported by Dr. H. H. Kimball of the U. S. Weather Bureau, to the American Meteorological Society. Dr. Kimball was reporting information published recently by Sir Napier Shaw, noted former director of the Meterological office of London.

Only half the energy that enters the earth's atmosphere reaches the ground, he said. A large part is reflected back into the void and some warms the atmosphere directly.

That reaching the ground warms the earth and is reflected back into the atmosphere from which very little escapes directly to the void again, it was explained. The energy in the atmosphere divides, part going back to the earth and part to the void.

THE calm, assigned by popular belief to precede a storm, may also come in the middle of it, according to W. E. Hurd, of the Marine Division of the U. S. Weather Bureau.

An area of quiet still atmosphere from which blue sky or twinkling stars can be seen overhead while a few miles away hundred-mile-an-hour winds of the tropical hurricane rage, was described by Mr. Hurd.

"One cannot always see clear sky above the calm center," said Mr. Hurd. "This opening in the clouds, called the 'eye', usually occurs when the tropical cyclone is of great intensity—when it exhibits hurricane strength. But we have the instance of a tropical cyclone near the Society Islands of the South Pacific in 1928 which had a finely developed eye although the surrounding winds were of moderate strength only.

"The eye is not ordinarily associated with small local wind-whirls," Mr. Hurd continued, "but it has been observed in a whirlwind 200 feet in diameter off the west coast of Mexico in August, 1927. At the summit of this whirlwind angry clouds were seen revolving about a patch of clear sky."

Science News-Letter, May 24, 1930

Sinful Protophyta

YEASTS, the ultimate sinners in all scofflaw occupations in the United States, have been makers of alcohol for many millions of years. Their cells have been found in rocks older than the Coal Age and infinitely older than the times of the dinosaurs, by Prof. Johannes Grüsz, Berlin paleontologist. With them in many cases were tiny bubbles of carbon dioxide gas, the same stuff that makes the "bead" on home brew.

Prof. Grüsz found the yeasts as an incident in his search for the oldest fungi in the world; yeasts are a specialized form of fungi. The other fungi which he found, in rocks of Devonian age, were parasites on the primitive plant life of those days. They infested their stems and fruiting bodies, breaking down the cells and feeding on tissues, as parasitic fungi do to farmers' crops and foresters' trees today.

Paleomycology

Science News-Letter, May 24, 1930

Oil

AMERICAN capital may make Germany an oil-producing country of world importance.

In recent years a number of small German companies have been boring into the northern plain where there are thought to be large deposits of oil. But they did not have the means to drill deeper than 1,000 feet and the government would not help them.

American interests have now gained control of these companies. With mining rights over about 1,600,000 acres, the foreigners have bound themselves to bore until oil is found and to carry at least five borings to a depth of 3,000 feet by 1936. Many wells in other parts of the world are deeper.

Mining Engineering

Science News-Letter, May 24, 1930

Yellow is Better

YOU must make your Johnny-cake and corn meal mush of yellow corn meal instead of white if you expect to get your daily supply of growth-promoting vitamin A from either of these two dishes, it appears from results of work just reported by S. M. Hauge and J. F. Trost of the Purdue University Agricultural Experiment Station.

These investigators found that vitamin A is present in corn which has kernels that are yellow all the way through. The fact that yellow corn contains more vitamin A than white was observed by Dr. H. Steenbock of the University of Wisconsin, but not until the work of the Purdue investigators was it known whether the yellowness associated with the vitamin was present in the outer coat or in some other part of the seed. Now it appears that it is the yellowness of the starchy storage tissue called endosperm, and not the yellowness of the outer coat of the grain, that indicates the presence of vitamin A.

This discovery adds one more requisite to the list of qualities expected in a successful new variety of corn. Heretofore yield and resistance to disease have been the main factors considered. Now the color of the endosperm must be taken into account, because it is of course desirable to have as many nutritive items as possible in the same food.

Professors Hauge and Trost have found that the vitamin A content of corn is inherited in a simple definite way, just as yellow color is. This will prove of great assistance to the plant breeders in the production of new varieties for they will know when and when not to expect the vitamin in making certain crosses.

Vitamin A is the one which prevents the eye disease known as xerophthalmia and is also necessary for growth. It is of vital importance in the nutrition of all the higher animals including man. It occurs rather abundantly in green leaves, in certain roots, in butter and in egg yolk. In edible plant tissue it seems to be usually associated with yellow color. Thus yellow carrots contain more than white, yellow turnips more than white, and so on as far as tests have been made.

Nutrition

Science News-Letter, May 24, 1930

1,954 *Motions*

IF you clear away the dishes for an average American family and do the job in the customary American manner you spend just 38 minutes and eight seconds a day at the task, and the number of motions—if you are interested—is precisely 1,954. This information, preliminary to bettering the American speed record, has been ascertained by Mary K. Heiner and N. M. Venner, of the University of Chicago.

By applying office efficiency to the dining room and kitchen, you can cut the daily dishwashing schedule to 22 minutes and 58 seconds flat, these investigators state in reporting their work in the Journal of Home Economics. Saving in energy amounts to almost 950 motions.

Present standard methods of American dishwashing include scraping and stacking the dishes at the table, washing the dishes by hand after each meal, and drying them by hand with a towel.

To reduce to a minimum the time and energy spent on dishwashing, a housekeeper must be willing to break with traditional methods, the investigators emphasize. Dishes for three meals must be washed at one time, probably after breakfast. The dishes are allowed to dry in the air instead of being wiped with a towel. Instead of storing all dishes in a cupboard, those for the next meal are separated and parked conveniently, while bowls and platters are stored on an open shelf near the stove. The rest of the dishes are stacked on a tea cart and transferred to the cupboard. Dishes waiting to be washed are left stacked on the sink table until washing time, thereby saving three minutes and 22 seconds otherwise spent in hiding them in the oven.

Home Economics

Science News-Letter, May 24, 1930

IN VARIOUS CI

Quiet

UNTIL its tranquility was broken by the severe earthquakes of May 5 and 6 in Burma and Persia, the crust of the earth had been singularly free from severe disturbances since the Aleutian Islands world-shaking shock of December 17 of last year.

This period of nearly six months of comparative freedom from earthquakes is unequalled in the recent annals of seismology. When earthquake experts gathered in Washington for meetings a few days ago it was a topic of conversation.

A local shock in Imperial Valley, California, the first week in March, and a larger earthquake centered in the Banda Sea, between the islands of Borneo and New Guinea, on March 26, were the only earthquakes on record in the quiet period.

Seismology

Science News-Letter, May 24, 1930

Prevents Rickets

OLD-FASHIONED cod liver oil is a better preventive of rickets than the modern product, viosterol, which consists of vegetable oils that have been supplied with vitamin D by irradiation, Drs. Adolph G. De Sanctis and John Dorsey Craig of New York reported to the American Medical Association.

SCIENCE FIELDS

Drs. DeSanctis and Craig based their report on observations made on over 200 normal infants. In a group of 100 infants given cod liver oil only three developed unmistakable signs of rickets. In a group of 123 infants given viosterol 29 showed undisputed evidence of rickets. Infants receiving no rickets-preventing agent at all develop signs of the disease in 25 out of 100 cases, many writers have reported.

The dosages of the two substances were the generally accepted and recommended ones: three teaspoonfuls of cod liver oil daily or 10 drops of viosterol.

The two physicians concluded that either the present recommended preventive dose of viosterol is too small to prevent rickets or else rickets is not due to lack of vitamin D alone. The latter possibility is more probable, in their opinion.

Pediatrics

Science News-Letter, May 24, 1930

1200-Year-Old Beard

A 1200-year-old beard is the unusual find made in an ancient grave accidentally uncovered by ditch-diggers near the town of Lörrach in Baden, Germany. The workers came upon several burials; they were identified by objects found with them as belonging to the Frankish culture of about 700 A. D.

One of the burials was in a coffin made of rough sandstone slabs. This latter, when opened by Dr. Georg Kraft, of the University of Freiburg in Breisgau, disclosed the somewhat decomposed skeleton of a man about 40 years old, with a matted triangle of wavy, red-brown hair where the chin had once been. The beard has a curious shape, being pointed but longer on one side than on the other.

Archaeology

Science News-Letter, May 24, 1930

Granite Dust Reduced

REMOVAL of air at a speed of 1,500 feet per minute, measured at the surface of the ventilating hood, is the standard for ventilating systems that will reduce the dust in the air of granite plants to a safe level, the U. S. Public Health Service has announced as the result of its studies just completed.

Dust in the various operations of the granite industry has long been a serious hazard to workers' health. The disease of the lungs known as silicosis was found to develop as a result of prolonged exposure to the granite dust through long periods of employment. Previous studies showed that when the air which the operator breathed had less than 10 million particles of dust per cubic foot of air, it was safe. Certain of the granite cutting plants had ventilating systems which provided sufficient ventilation to make the plants safe for the workers when the systems were properly operated, the recent investigations showed.

Mining Engineering

Science News-Letter, May 24, 1930

Strangled

COTTON plants are strangled to death by hard, dry clay in a new disease of cotton which has been discovered by J. J. Taubenhaus, W. N. Ezekiel, and H. E. Rea of the Agricultural Experiment Station, Texas.

"Root strangulation," as the disease has been named, occurs only in flat, poorly-drained, heavy clay soils which are compacted by continuous rain or irrigation. The affected plants wilt and die suddenly.

When the dead plants are pulled they seem to have no roots. However, a careful investigation showed that the plants do have a well-developed root system, but that the hard soil literally strangles the plants to death by constricting the roots and preventing the passage of moisture from the soil to the top of the plant.

Plant Pathology

Science News-Letter, May 24, 1930

Scooped-Up Diamonds

MOST of the world's diamond supply no longer comes from mines. The gems are scooped up with steam shovels.

To be sure, the steam shovels get a lot of sand and only a few diamonds, but the diamonds can be sifted out as though they were ordinary pebbles. The discarded sand piles up into a veritable artificial mountain.

This gathering of diamonds from the surface is a new development in the obtaining of the world's most valued gems. For centuries diamonds have been laboriously dug from the earth, often at great depths. But recently diamonds were found in great numbers in alluvial deposits in South Africa, and now fully 70 per cent. of the world's supply comes from these surface scrapings.

Mining

Science News-Letter, May 24, 1930

Jazz

IF you dislike jazz music, it may be that your ears do not have the same limit for high pitched sounds that exists in the ears of other people.

This possible connection between dislike of jazz and the upper audible limit was suggested by E. Russell Wightman of Gunnison, Colo., in a report to the Southwestern Division of the American Association for the Advancement of Science.

In Mr. Wightman's experiment upon a large number of people, the lower audible limits of their hearing were not found to vary much with different individuals. But range for the hearing of the high-pitched sounds was slightly over 4,000 vibrations per second to much over 50,000 vibrations per second. About three-quarters of the individuals had an average of 15,000 vibrations per second.

One curious condition was noted in the tests. Many individuals showed bands of hearing or areas of frequency in which no sound was sensed. Some have as many as four such blank bands or silent zones. But only a very small percentage of these individuals examined showed such blank bands.

How individuals determine direction of sounds was also investigated by Mr. Wightman. There has been much discussion on this subject among psychologists and physicists during the last twenty or more years. Mr. Wightman found evidence that when pure tones are used, some individuals determine direction by means of phase-difference between the sounds coming to the two ears, while others determine direction by means of the relation of aptitudes in the two ears. Still others determine direction by means of both.

Psychology

Science News-Letter, May 24, 1930

Plant Patents

THE plant patents bill, which if enacted will make it possible for plant breeders to obtain patent protection on new varieties that can be propagated by cuttings, grafts and similar means, has been passed by the House of Representatives and is now on the Senate Calendar awaiting action. It may be passed by the Senate also before adjournment. If it is left unenacted in the jam of closing business, it will remain on the Senate calendar and can be acted on early during the next session of Congress.

Horticulture

Science News-Letter, May 24, 1930

Pithecanthropus Erectus — A Classic of Science

Biology

PITHECANTHROPUS ERECTUS—A Form from the Ancestral Stock of Mankind. Part of a paper read before the Berlin Anthropological Society on the 14th of December, 1896. Translated from the Anatomischer Anzeiger, Vol. XII. Published in the general appendix to the Smithsonian Report for 1898. Washington, 1899.

The controversy over the "missing link" has been going on for some thirty-five years with little sign of abating. This does not mean that scientists cannot make up their minds about Pithecanthropus. The "anthropists" and the "pithecists" hold each to their own views with passionate fervor. But the fact that opinion is so divided over these ancient bones only proves how intermediate they are between ape and man. A scientist has recently proposed the only solution of the controversy—to find the rest of the skeleton.

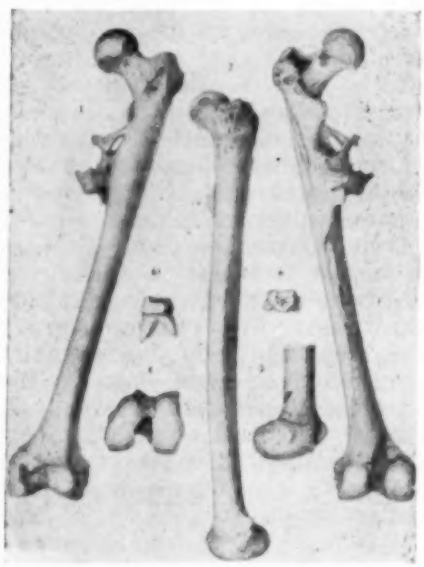
PART TWO

The Skullcap—*Continued*

Its considerably greater size constitutes a significant difference between it and all other skulls of apes. In the length and breadth measurements of the skull the chimpanzee is exactly a mean between it and the largest gibbon. Its cranial capacity I estimated in my above mentioned description, according to a comparison of the external lineal dimensions, as about 1,000 c. cm. Estimating now upon a more recent comparison of the internal linear dimensions with those of gibbons' skulls makes it but little more than 900 c. cm. A capacity of 900 c. cm. is, however, far above anything we know in the skull of apes. The largest skulls of anthropoid apes have, on the average, no greater capacity than about 500 c. cm., and it is very seldom that they have been found to attain the capacity of 600 c. cm.

Disregarding this, some believe that the skull may have belonged to a true ape. If we should imagine the skull of *Hylobates agilis* to have somewhat more than doubled its mass, we should have a skull of a similar great ape. But if in actual fact a Hylobates had reached such a size, it is quite certain that his cranial capacity would not have increased in the same degree, for we continually find in the most diverse families that large animals have relatively smaller brains than smaller allied species. For example, the dwarf antelope (*Nanotragus pygmæus*) has in proportion to its bodily weight more than four times as much brain as the Beisa antelope. The smaller lower apes very much surpass in this respect the large anthropoid apes, and the gibbons possess, in proportion to their bodily weight, at least twice as much brain as the great anthropoids.

Such an imaginary gigantic Hylobates would be about as tall as a man and about as heavy as the great anthropoids. Its cranial capacity would therefore not exceed some 500 c. cm. But this is only a little more than that of Pithecanthropus. A true ape with a capacity of 900 c. cm., must, on the contrary, be a giant beside which the largest gorillas would be dwarfs. Even if the bodily size increased only in the same ratio as the cranial capacity, the animal would have a body almost twice as large as that of a large gorilla. But the bodily size increases in a greater ratio than that of the brain and the cranial capacity, so that it may be assumed that the size of an anthropoid ape having a cranial capacity of 900 c. cm. would be at least three times as large as that of a large gorilla; that is to say, about as large as a pretty large horse. It is not easy to imagine an ape like that leading the tree life of the nimble Hylobates.



Several views of the single leg-bone and one of the three teeth which, with the skullcap, are all we know of the biological puzzle called Pithecanthropus erectus. Some biologists say this femur is wholly human, others agree with Dubois who says that it has peculiarities rarely found in man but common in certain apes.

The cerebral portion of the skull of such a gigantic ape would, in relation to the rest of the body, be much smaller than that of the gorilla. This relatively small cranial capsule would have all the provisions for the attachment of a powerful masticatory apparatus for furnishing nourishment to the gigantic body, such as is shown by the skull of a gorilla, but in a much greater degree than in this living gigantic ape. For a jaw of such mighty proportions, which would be much larger in mass than the whole of the rest of the skull, there would have to be a zygomatic arch much more extensive and more strongly vaulted than that which the gorilla possesses. Upon the skullcap there would have been formed strong bony ridges for the attachment of the temporal muscles, and these ridges would certainly have formed crests in the middle and behind. The orbital rims would have been raised in a much more striking manner than is seen in the gorillas' skull, and the impression of the bestiality of such a gigantic ape would have been much greater.

We see, however, nothing of this in this fossil skull. It is as smooth, even, and destitute of crest as the skull of an ordinary gibbon.

The skullcap, therefore, in spite of its ape-like appearance, can not have belonged to an ape, because in its excessive capacity it is dissimilar to both a gibbon's skull and that of a great gorilla.

There are, however, some features that separate this skull from that of the apes of the Old World and ally it to that of men. These concern the occiput. As already remarked above, there is a peculiar formation occasioned by the abrupt separation of the *planum nuchale* from the upper part of the *squama occipitalis*, determined by the *torus occipitalis transversus*, which is certainly a pithecoid feature; compare the inclination of the *planum*

The top and left side of the Pithecanthropus skullcap. The somewhat prominent eye-brow ridge and the lack of ridges for attachment of heavy facial muscles are readily seen. The discoverer believes that these appearances show that the animal was small and lightly built, with a relatively large brain-case.

nuchale to a plane formed symmetrically through the most prominent part of the glabella and of the external occipital protuberance, and it will be seen that in this respect there is a great difference between this skull and those of all the apes of the Old World. The most diverse species of the latter show a slighter variation with each other regarding the angle between the nuchal plane and the glabello-protuberantial plane than is shown between them and the fossil skull. Among the anthropoids I find not more than three degrees of variation; in *Semnopithecus maurus* the inclination of the nuchal surface is 4° less, and in *Macacus cynomolgus* it is 10° less than the minimum among the anthropoids. In the Java skullcap, the occiput has the greatest likeness—only being double the size—to the highly vaulted skull of a gibbon. It is not strange, threfore, that I have made the facial portion of the skull not very different from that of the gibbon.

II.—Teeth

The teeth, a left second upper molar and a third right upper molar, belong, if we may judge from the circumstances of their discovery, to each other and to the skullcap. They are also modeled in a very similar manner and are in the same state of preservation and of petrifaction. The unequal wear of their crowns and the considerable difference in their size are appearances that can often be seen both in the skulls of men and of apes. Both have very strongly diverging roots, such as others as well as myself acknowledge never to have seen in human molars. Only exceptionally are there found in man upper molars with a crown of such great size. I measured on a skull from New South Wales, in Virchow's laboratory, the transverse and sagittal diameters of a left second upper molar, finding it 15.5 by 12.5 mm., and those of a third upper molar, finding it 15 to 10.5 mm. The same dimensions of the fossil molars from Java are 14 by 12 mm. for the second upper molar, and 15.3 by 11.3 mm. for the third upper molar. A second upper molar from the cave of Spy I found to be of exactly the same dimensions as the molar from Java.

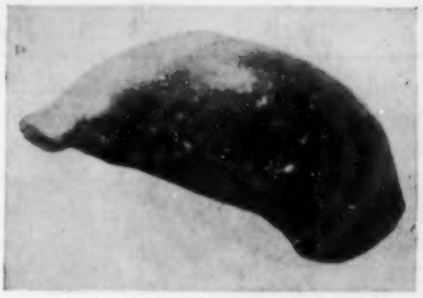
In the form of the crown the Javanese molars show a marked ape-like type; that is to say, in the relative development of their cusps. As in anthropoid apes, the posterior buccal cusp is in both teeth the smallest, so that the cusps of both are smallest on the outer side. In man the reverse is the case. Only in the third molar is an exception to this rule rarely found.

An exhaustive comparison has, however, convinced me that the teeth are in no closer relation to those of any of the living anthropoids.

In spite of all their simian characters, both, especially in the third molar, show a strong retrogression of the crown, such as is more frequently found in man than in the anthropoid apes. According to this the general arrangement of the dental arch must have been widely different from that which obtains with the great anthropoid apes. Comparing the size of the teeth with that of the skull, the proportion is found to be the same as that in the gibbon, but somewhat less than that which prevails with the anthropoid apes. They therefore agree very well with the smooth, crestless skullcap.

III.—Femur

The femur was quite generally declared to be human by authors who had closely examined either the actual specimen or drawings of it. It has, as before mentioned, a very deceptive resemblance to the human femur. It differs from the latter, however, and that difference is as great as that between bones of the same name in different but somewhat related species of mammals having a similar locomotion, as, for instance, *Colobus* and *Semnopithecus, Cervus* and *Antilope*. The most important difference concerns the form of the diaphyses in the popliteal region. It is much rounder than in man. The *planum popliteum* is therefore less extensive and more convex, so that



exactly in its middle a kind of swelling extends as far as the neighborhood of the condyles. In the human femur the most projecting portion of the popliteal region is in the neighborhood of the lateral lip of the linea aspera. In the fossil femur, on the contrary, that lip is situated more on the lateral surface of the shaft.

After examining hundreds of human femora, Manouvrier could find only two that had a somewhat similar shape. It is therefore a very rare form in man. With the gibbon a similar form normally occurs, the median convexity in this species being, however, somewhat higher. This may be explained by the peculiar insertion of the femoral head of the biceps femoris that occurs in this species, it being attached in the middle line below the adductor magnus in close connection with the vastus internus. An extension of these conditions might, as Dr. Hepburn has pointed out to me, produce the median convexity of the entire popliteal region which we find in the fossil femur. In man the popliteal space becomes flattened by reason of the wide separation of the medial and lateral muscles in this region. In those isolated cases of a similar formation, found in an examination of hundreds of femora, there may have been a simian form of muscular attachment.

The exostosis of the fossil bone—considered by me as the result of a traumatic periostitis, and by Virchow as caused by a psoas abscess that had descended from along the spinal column—appears as a so-called tendinous or aponeurotic deposit of osseous tissue, such as occurs not very infrequently in man and is also to be seen, though in a less degree, on the humerus of the skeleton of an orang-outang in the Dresden Museum. This pathological formation has no significance as regards the systematic determination of the bones.

It has been generally allowed by everyone that the femur must have belonged to an animal that walked erect. The circumstances under which it was (*Turn to next page*)

Pithecanthropus erectus—*Continued*

found, in the neighborhood of the skullcap, make it very highly probable that both belonged to the same individual; and now, since we have shown that the anthropoid skullcap may not have belonged to an ape, but possibly to a being that walked upright, this probability increases quite to certainty, for this reduces the deficiency in human characters which the skullcap showed when compared with the femur. The femur is not human in the usual sense, for it, as we have seen, shows features that occur only very seldon in human femora. Besides, the similarity of form may, as before stated, be sufficiently explained by a similarity of function, so that an entirely human form of femur need not necessarily have belonged to a man, but be found likewise in some other genus. Only an examination of the entire skeleton could give a complete solution to this question.

According to the relative proportions of these parts they can not both have belonged to an ape. For an ape with such a cranial capacity would, as we have seen, have been a giant, whose femur would certainly have been much larger than twice the size of that of a siamang. But a man with a cranial capacity of 900 c. cm. would have a shorter femur; for all men, except microcephali, that have so low a capacity as this have a much smaller stature than that of 165 to 170 cm., which is the height of the individual, as calculated from the length of this femur according to human proportions. This is again an evidence that the individual in question was, in the anatomical sense, neither an ape nor a man.

With the length and breadth measurements of the skull, however, the length and breadth of the femur well, both from a human and anthropoid point of view. A man with a skullcap of these dimensions could well have had a femur of that size, and if we conceive the proportions of a siamang to be doubled, the length and breadth of the skull and the length and breadth of the femur will exactly correspond with that of Pithecanthropus.

Nothing contradicts the view that the possessor of this cranium had a body to which this femur belonged. The skull requires exactly such a femur and no other.

As therefore, from different points of view, probability speaks most strongly in favor of the common origin of these fragments, it is carrying skepticism too far to longer doubt that both of them, and the teeth as well, belonged to one skeleton.

I believe that it now hardly admits of a doubt that this upright-walking ape-man, as I have called him, and as he is really shown to be after the most searching examination, represented a so-called transition form between men and apes, such as paleontology has often taught us to recognize between other families of mammals; and I do not hesitate now, any more than I formerly did, to regard this *Pithecanthropus erectus* as the immediate progenitor of the human race. This is my conviction after the most careful testing of the matter, and has only become stronger after having submitted the specimens to many anatomists.

The exact position to be assigned to the ape-man in a system is more or less a matter of taste. According to the anatomical characters ordinarily used to separate the groups of mammals, we must at any rate exclude it from the genus Homo. Unless we considerably change and extend the characters that have hitherto been considered good for the family of the Hominidæ, it can not even be admitted there. Quite the same may be said of the Simiidæ and its species.

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Solving a Scientific Hoax—*Continued*

asserting that the jumble of ideas about the alphabetic writing on the inscription proved pretty well that it was not alphabetic at all.

The joker, if he lived through these decades, continued to enjoy his private jest with the world's scholars. There is no doubt that he has died long before now, and so he is missing the present climax of the affair.

To Andrew Price, printer, the Grave Creek mound and its inscription have long been part of the familiar local traditions of his state. He never saw the stone, but he has seen various copies of the inscription, and being a printer, his first interest was to sort out the separate letters on the stone. This gave him his first clue. The figures do not stay neatly on their separate lines, like most printed letters, but instead he saw that they run together in some instances above and below the lines.

In his statement, he says humorously, "I conceived a new test for the tablet, and hunted up a number of alphabets, including Hieroglyphic, Hieratic, Babylonian cuneiform, Semitic, Phoenician, Greek, Hebrew, and Roman, and sat down to draw a few far-fetched conclusions."

But before he began struggling with these ancient texts, he happened to glance at the picture of the inscription which lay on a chair some feet away. From that angle, he thought he could read the last line, "Oct 14 1838."

"As that was the year the tablet was discovered, I put the alphabets back in the bookcase and tried to read it in good old West Virginian," says this astute printer.

Long experience at puzzling over badly written manuscripts kept him at the job, and with his valuable clue that the letters extended over more than one line, he picked out the entire message, recognizing at once its connection with Dickens' satire.

The statement of Mr. Price's solution of the mystery has been received at the U. S. National Museum, by Dr. Walter Hough, curator of archaeology.

"The inscription from the Grave Creek Mound is one of the most famous tablets in American archaeological annals," Dr. Hough stated, in commenting on the new turn that the situation has taken. "The inscription has been a mark for linguists to shoot at for almost a hundred years. There is no doubt that Mr. Price has solved the problem, aided by his knowledge of letter forms."

Jubilant at his success, Mr. Price has added his own satirical fling at the antiquarian who once solemnly asserted that science would continue to ask how the stone came to be in the mound but the question would never be answered.

"Fiddlededee!" chuckles Mr. Price, "Never be answered? The Dickens it won't! The man to answer it is a man who has read Dickens' books at least twenty times; who set type from illegible manuscripts for years; and who is an unworthy member of the Academy of Science. Hooray for Bil! Stumps' stone!"

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NATURE RAMBLINGS

By Frank Thone

Indigo Bunting

IF you are walking along the edge of the woods or across a brushy pasture and see a flash of blue winging through the air, look twice before you decide that it is a bluebird. It may be that somewhat less abundant but equally beautiful bird, the indigo bunting.

There is no danger of confusing the two birds, if you can get a fair look at him. The indigo bunting has no red underneath, as the bluebird has, but is blue on both breast and back. The only feathers he has that are not blue are the large dark ones of his wings and tail, and even these are blue-edged. This is his summer garb; in winter he has a general sparrow-like appearance. His mate keeps her sleek but inconspicuous brown dress the year round.

The song of the indigo bunting is a beautiful sustained trill, not unlike that of a canary. He is very fond of singing, too, and will frequently stage a recital in midsummer, long after most other birds have become silent.

Indigo buntings are not as well known, perhaps, as bluebirds, because they are rather more shy of humankind, and prefer to live in the tangled thickets and broken woodlands, remote from habitations. But for the nature-lover they are worth patient seeking, for they have few peers and no superiors in beauty among our native birds. There is a jewel-like brightness about their deep blue feathers that surpasses the blue of the bluebird. It is more like the flash of the scarlet tanager than it is like any other blue to be found on birds with which we are familiar.

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Mice Detect Monoxide

Queer little Japanese waltzing mice have been put to good use by scientists who have found the mice even better than canary birds for detecting deadly carbon monoxide gas in the air, the U. S. Bureau of Mines has just reported.

Carbon monoxide is a highly fatal gas that has neither color nor odor, so that it can creep on a man unaware and overcome him almost before he knows what has happened to him. Small animals are affected more quickly than man by the same concentration of this death gas. Therefore they have been used to detect the presence of the gas in the atmosphere of mines and other places where it is a menace.

The difference between the time when the animal is overcome and that when man will be overcome is sufficient to allow a man to return to fresh air, put on a mask, or protect himself in some other way. However, the margin of time between effects in the animals and in men is not very wide and experience with canaries has shown that an occasional specimen may be tolerant enough to fail to exhibit symptoms before serious effects are incurred in men.

Because the effects of carbon monoxide poisoning are increased by physical activity, the waltzing mice, with their almost continuous and violent movements, show the effects of exposure to the gas much more quickly than any other animals and are therefore especially suitable for detecting the presence of the gas.

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Prandtl Honored

YEARS ago Dr. Ludwig Prandtl, professor at the University of Göttingen, Germany, studied how air rushes around moving planes. His work was so far ahead of his time and so accurate that it forms the basis of much present aerodynamic theory.

Now Dr. Prandtl is awarded the second Guggenheim gold medal for notable achievement in aeronautics. Orville Wright, who with his brother made the first successful flight, was presented the first medal last month.

Aviation

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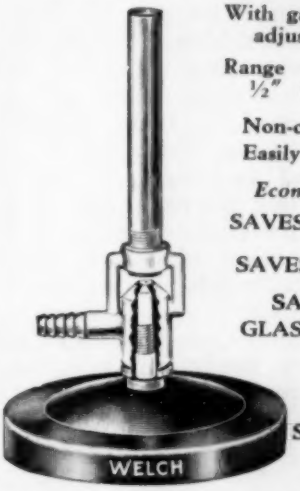
BUNSEN BURNERS



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Range of flame ½" to 12"

Non-corrosive

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Economical

SAVES TIME

SAVES GAS

SAVES GLASSWARE

SIMPLE

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No. 4750 BUNSEN BURNER
With Needle Valve Gas Control

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Per dozen	7.20
Per hundred	50.00

No. 4750B BUNSEN BURNER
Same as No. 4750 But Without Gas Control

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Sciences Cooperate to Study Mayas

Anthropology—Archæology

Carnegie Institution Calls on Many Specialists

SPECIALISTS representing many branches of science are being called into consultation to help archaeologists explain the remarkable Mayan civilization which flourished in America before the coming of Columbus.

For fifteen years the Carnegie Institution of Washington has been digging up and restoring Mayan temples and palaces in the jungle country of Yucatan and Guatemala. Carved writings were left by the learned Indians who once conquered the American tropics and these have been studied.

To aid in interpreting its finds, the Carnegie Institution is now calling upon medical men, weather experts, specialists in tropical plants and animal life, anthropologists who can take precise measurements of modern descendants of the Mayas, psychologists, geographers, and aviators. Dr. A. V. Kidder, directing archaeological work for the Carnegie Institution, is engaged in synthesizing the various lines of activity.

Descendants of the once distinguished Mayan line make up the bulk of the population of Yucatan today. A joint project of Harvard and the Carnegie Institution has measured and studied 1,800 living Indians in Yucatan. This will show the present physical type of these people who have been living under tropical conditions for so many centuries. Linked with medical studies, it will show their susceptibility to various diseases.

One key-problem in the Mayan enigma is to trace the time and place at which corn was first tamed, so that it became a grain crop. It was this important agricultural advance which made it possible for Indian groups to settle down as farmers and to build towns and have leisure for the arts and sciences. It is now believed that the wild plant teocentli was first crossed with some unknown plant to produce maize somewhere in the highlands of Mexico. Specialists in plant heredity are studying the rate of development of recent varieties of corn as one link in the chain of needed evidence.

Dr. F. M. Gaige of the University of Michigan has begun to investigate the animals and plants of Yucatan, hoping to learn more about the food of the ancient Mayas, and the materials they drew on for useful articles and for their fine arts.

Thorough investigation of the home land of the Mayas will not only clear up puzzles of how the Mayas accomplished so many remarkable things in a tropical region that has returned to its original jungle state, but the evidence unearthed will benefit modern inhabitants of the tropics, it is hoped.

Summing up researches in Yucatan that are focussed on the Mayan civilization, Dr. Kidder cited: Studies of Mayan language by the University of Chicago; biological reconnaissance by the University of Michigan; ethnological reconnaissance by the University of Chicago, all in their first year of work; records of the clinic at Chichen Itza, now in its third year; medical survey of Yucatan by Harvard University, in its second year; survey of pottery in the Mayan area, just started; researches of the hieroglyphics of the Mayas by Dr. S. G. Morley, of the Carnegie Institution, which have continued for twenty-five years; excavations at Uaxactun in Guatemala and at Chichen Itza in Yucatan by the Carnegie Institution.

Proposed activities discussed by the cooperating scientists include the re-translation of the native chronicles; air survey of the Mayan area; and surveys of the geology, climate and farming conditions.

Scientists Differ Over Peking Skull

Anthropology

THE skull of Peking Man, *Sinanthropus pekinensis,* unearthed near Peiping last winter, promises to become a very literal bone of contention among scientists. Dr. Davidson Black of Peking Union Medical College, who first described the specimen, has now cleared the entire exterior of the mass of travertine limestone in which it was embedded, and in communications received in this country reaffirms his stand that the skull represents an entirely new genus of human beings. American anthropologists still hesitate to agree with him.

After examination of certain parts of the skull newly laid bare, especially the region about the ear, Dr. Black expressed the opinion that "here for the first time among hominids a stage of development is manifest which is much more archaic than that obtaining in Neanderthal Man while at the same time it presents features recalling the relations characterizing this region in anthropoids (e. g. Chimpanzee)."

Dr. Black concludes with the opinion that Peking Man presents pre-Neanderthaloid characteristics, and that the genus is not far removed from the common ancestral type from which both Neanderthal man and modern man evolved.

Dr. Ales Hrdlicka, physical anthropologist of the Smithsonian Institution, differs sharply from this view, which would make Peking Man much older than, and possibly ancestral to, the race of Neanderthal. After examining a full set of photographs of the skull which he has just received from Prof. Black, he declared that he could not see the difference between the new specimen and the recognized Neanderthalers of Europe.

The top view of the skull is especially suggestive, Dr. Hrdlicka declared. The silhouette of the cranium from this point of view shows the distinct narrowing toward the forehead, with the sudden and pronounced flare of the massive eyebrow ridges, that are found developed to this degree only in Neanderthal skulls.

"Put this skull in a collection from Europe," Dr. Hrdlicka said, "and I believe every student of early man would declare it a specimen of the Neanderthal type. Such variations as it shows from other skulls of this species are the kind of thing one might find among individuals of any race. Until we have much more evidence I am still unable to see that we are justified in classing it as a new species, much less as a new genus."

Shaken Reed Shows Path Through Clouds

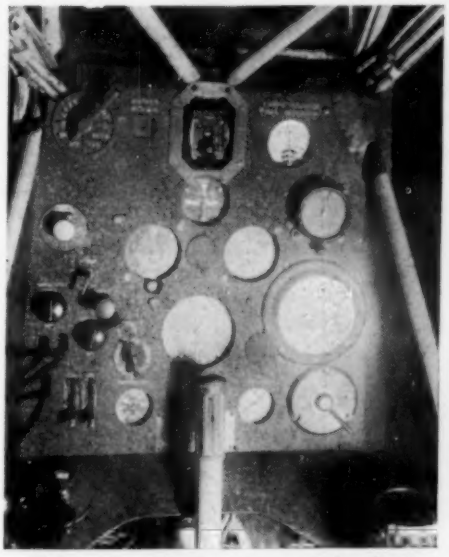
Aviation

New Radio Beacon Reaches Eye Instead of Ear

TWO vibrating white reeds on the instrument boards of New York-Cleveland mail planes will soon paint an air path visible in fog, rain and snow, over 250 miles of the worst flying terrain in the United States, it is announced by Clarence M. Young, assistant secretary of commerce for aeronautics.

This visual radio range beacon to be installed during the next few weeks will supplement the aural type radio range beacon that has been in use at Bellefonte, Pa., in the Appalachian mountains, for more than 18 months, and if it proves satisfactory will probably replace the aural beacon and be extended to other parts of the country. Its installation is necessitating expensive changes in transmitting equipment and the addition of a reed box to the planes. The apparatus is a joint development of the U. S. Bureau of Standards and the aeronautics branch of the Department of Commerce.

The aviator tells whether he is on the right path by watching two white reeds vibrate. If the reed on the left vibrates most, he has veered off to the left of his course. If the amplitude of the right-hand reed is greatest, the plane is too far to the right. When both vibrate alike the plane is on its true course.



What the flyer must watch. Instrument board for airplane showing radio-impelled reeds placed at the top.

The aural beacon system now in use gives the same information by coded signals picked up in the head phones. Great concentration is required of the pilot and he must wear the phones practically all the time.

Neither beacon system makes unnecessary the searchlights which are installed at 10-mile intervals. When the weather is open the lights can be followed, but when the aviator must go for miles through fog, rain or snow which completely hides the ground and lights, he has to rely on the beacon to keep him on his course. A recent test flight from Detroit to Washington through bad visibility was made almost entirely by beacon signals and not by maps.

The path of the beacon will bring the pilot close enough to the landing field for him to see the ground lights and make a descent by sight. No effort is to be made at the present time to put in practice "blind" landing as accomplished by Lieut. James H. Doolittle for the Guggenheim Fund.

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Wanted: Moths

ANY moth-eaten fur coats, or woolen dresses, today? This strange inquiry comes, not from an old-clothes dealer, but from Cornell University.

In its quest for a practical method of controlling clothes moths the Department of Entomology, at the University's experiment station, has found it impossible to breed enough of the pests to keep up with the investigation. In a single test the experimenters attempt to kill off fifty each of the moths, eggs, larvae, and pupae. And the experiments have to be made repeatedly. Hence the appeal to the public to donate articles which moths are now using as dinner rations, or as a headquarters.

Prize gifts received include a toy lamb, a child's feather bed, and a set of furs, all supporting large colonies of the pests. One fine rug—fine from a scientific point of view—had more than 200 larvae, and a fur coat almost as many, the moth investigators stated.

Entomology

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Are You Intelligent Enough to Drive?

Psychology

"THE best safety device is located above the neck—about four inches above the neck."

With this quotation from a sapient friend, Dr. Walter V. Bingham, industrial psychologist of the Personnel Research Federation of New York City, keynoted his radio talk on Psychology and Highway Safety, given over the Columbia Broadcasting System under the auspices of Science Service.

Engineers, he said, have done much toward making driving safer, both in designing better and stronger vital parts for cars and in adapting new highways to the new traffic conditions. But mechanical factors after all cause only a minority of accidents. The old joke about smashups being caused by "the nut that holds the steering wheel" still remains grimly true. To remedy the weaknesses and defects in this complex mechanism is the task of the modern psychologist.

Some psychological defects that result in accidents, Dr. Bingham said, are inherent in the unfortunate drivers and cannot be remedied. Such, for example is color-blindness, which makes about one-twelfth of all men unable to be sure whether the traffic light shows red or green. Such also are slowness of wit, in judging what the other fellow is going to do next; or slowness in reflex action, preventing one from doing the right thing quickly enough even when he knows what should be done.

If such defects are so serious as to amount to real incompetence, the driver in question should never be allowed a license. Frequently, however, they are not of so grave a nature, or the driver knows of them or even unconsciously compensates for them without knowing about them.

Proper tests, Dr. Bingham said, will help to bring out weaknesses that might result in trouble and will help the person concerned to seek proper remedies if they are available, or will enable the community to protect itself against the hopeless case who is practically sure to get into jams.

Phychology

Science News-Letter, May 24, 1930

FIRST GLANCES AT NEW BOOKS

THE SIZE OF THE UNIVERSE—Ludwik Silberstein—*Oxford Press*—215 pp., $3.50. Much research of today is directed toward obtaining a true picture of the universe. Dr. Silberstein is an authority in the newer developments of theoretical physics and astronomy and this contribution to the determination of the invariant curvature radius of spacetime will therefore take its place alongside his other contributions to the particular sector of science in which he works. Dr. Silberstein gives 3 to 4.10 raised to the eleventh power astronomical units as the best value of the curvature radius, a value about one-eighteenth that derived from data based on measurements of globular clusters and Magellanic clouds.

Cosmology
Science News-Letter, May 24, 1930

OUTLINES OF MODERN BIOLOGY—C. R. Plunkett—*Holt*, 711 pp., $4. This is a comprehensive and well-balanced textbook adapted for general college courses offered to adequately prepared students. It is not open to the criticisms leveled at many general biology texts, that the basis is almost wholly in animal biology, for the author has taken pains to give the main facts of plant physiology and anatomy the same emphasis and development that he gives to the facts about animal life.

Biology
Science News-Letter, May 24, 1930

X-RAYS—B. L. Worsnop—*Dutton*—101 pp., $1.10. A concise review "not addressed to the specialist, but rather to those who have a scientific training and a wish to have a statement of the present position in X-rays." Written by the lecturer in physics at King's College, London.

Physics
Science News-Letter, May 24, 1930

THE WORST JOURNEY IN THE WORLD—Apsley Cherry-Garrard—*Lincoln MacVeagh*, 585 pp., $5. The Antarctic is again at the forefront of polar exploration on account of the exploits of Byrd, Wilkins and their associates. This narrative of Scott's last expedition from its departure from England in 1910 to its return to New Zealand in 1913, now published in America for the first time, will make interesting reading. Here is the story of polar exploration as it was before the introduction of the airplane.

Antarctic Exploration
Science News-Letter, May 24, 1930

THE PSYCHOLOGY OF CHILDHOOD—Edgar James Swift—*Appleton*, 431 pp., $3. This might be called a psychology of parents, as well as of childhood, for there is a good deal in it, both directly and indirectly expressed, about the attitude of the adult affecting the child. Fathers and mothers, for whom the book is chiefly intended, will find the psychology presented very intelligibly, without technical detours, and they will find a good many useful rules of practice that they can apply to their households, and to themselves.

Psychology
Science News-Letter, May 24, 1930

SOVIET ECONOMIC DEVELOPMENT AND AMERICAN BUSINESS—Saul G. Bron—*Liveright*, 147 pp., $1.50. No experiment in economics is creating more interest and conflict of opinion than that now in progress in the realm of the Soviets. The 5-year plan of the Soviet Union contemplates a widespread reorganization and modernization of Russian industry. This book, written by the former chairman of the board of directors of the Amtorg Trading Corporation, the Soviet buying agency in this country, reports the first year's results under the 5-year plan. An appendix giving the terms of foreign concessions and listing the technical assistance that American firms and engineers are rendering Soviet organizations makes interesting reading.

Economics
Science News-Letter, May 24, 1930

GUIDE TO THE STUDY OF ANIMAL PARASITES—W. A. Riley and R. O. Christenson—*McGraw-Hill*, 131 pp., $1.50. A compact book giving the main facts about the types of protozoa, worms and other pests that make our lives miserable or our deaths sure. It should be very useful in the preparation of physicians and public health workers, and as a *vade-mecum* after they have entered upon their work.

Parasitology
Science News-Letter, May 24, 1930

CAPTAIN SCOTT—Stephen Gwynn—*Harper & Brothers*—239 pp., $4. Scott, the human being, rather than Scott, the explorer, is the subject of this biography. Great men are often best revealed by their letters and it is largely through the quotation of many of Scott's letters and reports that his life and achievements are portrayed.

Biography—Exploration
Science News-Letter, May 24, 1930

INDUSTRIAL ELECTRICITY AND WIRING—James A. Moyer and John F. Wostrel—*McGraw-Hill*, 469 pp., $2.75. Although intended as a textbook or a volume to be read by electrical students, those whose electrical activities do not extend further than the replacement of fuses and burnt out lamps will find within its pages explanation of the why and how of wiring and lighting.

Electricity
Science News-Letter, May 24, 1930

PLANT BIOLOGY—H. Godwin—*Macmillan*, 265 pp., $2.90. This textbook by a leading British author is a good example of the present trend in the presentation of biology from the physiological standpoint, replacing the heavy stress on morphology that prevailed some years ago. The author gives rather more space to the physiology of the lower plant phyla than is usually devoted to this subject in a book of this type.

Biology
Science News-Letter, May 24, 1930

A HISTORY OF THE JEWS—Paul Goodman—*Dutton*, 466 pp., $1.50. A new edition of a popular condensed history of the Jews, which will repay reading by Gentiles as well as by those for whom it was primarily written.

History
Science News-Letter, May 24, 1930

AN INTRODUCTION TO CHILD STUDY—Ruth Strang—*Macmillan*, 550 pp., $2.75. Explains in very simple fashion normal child development from infancy to adolescence, and offers practical suggestions for use in studying and guiding children in home or school. The plan of the book makes it suitable for parents or teachers who wish to become acquainted with the progressive steps in child study, and also for group study, as in parents' clubs, county demonstration groups, and high school home economics classes.

Psychology—Education
Science News-Letter, May 24, 1930

GREEN MAGIC—Julie Closson Kenly—*Appleton*, 194 pp., 92c. A breezily written book on the elements of botany, aimed at the grammar-school level. Grown-ups may find it entertaining, however, as well as a source of information for the satisfaction of the insatiable curiosity of small pupils in their own family circles.

Botany
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Punch Here to Fit Science News-Letter Binder Cover